REMARKS

Claims 1-10 are pending in the present Application. Claims 2 and 3 have been canceled, and Claims 6-10 have been withdrawn. No claims have been amended, leaving Claims 1, 4, and 5 for consideration upon entry of the present Amendment.

Reconsideration and allowance of the claims are respectfully requested in view of the following remarks.

Claim Rejections Under 35 U.S.C. § 102(b)

Claims 1, 4, and 5 stand rejected under 35 U.S.C. § 102(b), as allegedly anticipated by U.S. Patent No. 6,277,480 ("Veerasamy," cited previously). (Office Action dated 03/27/07, page 2) In particular, the Examiner has alleged that although Veerasamy does not explicitly teach that the diamond-like carbon ("DLC") inclusive layer contains silanol (Si-OH) groups, those groups are inherently formed on the DLC surface as evidenced by Theil et al. (J. Vac. Sci. Technol. (1990) 8(3); 1374-1381, see p. 1374, col. 1, newly cited). (Office Action dated 03/27/07, page 3) Applicants respectfully traverse this rejection.

To anticipate a claim under 35 U.S.C. § 102, a single source must contain all of the elements of the claim. *Lewmar Marine Inc. v. Barient, Inc.*, 3 U.S.P.Q.2d 1766, 1768 (Fed. Cir. 1987), cert. denied, 484 U.S. 1007 (1988). In addition, in order to support an anticipation rejection based on inherency, the Examiner must provide factual and technical grounds establishing that the inherent feature necessarily flows from the teachings of the prior art. *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Int. 1990); *In re Oelrich*, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981). The Examiner has failed to show that silanol groups are necessarily formed on the DLC layer based on Theil et al. for at least the following reasons.

First, Theil et al. disclose depositing a thin film of SiO_2 on heated substrates where silanol groups can be incorporated into the thin film by remote plasma-enhanced chemical vapor deposition ("PECVD"). (See, p. 1374, col. 1) It is clear that thin films of SiO_2 can be prepared without silanol groups using PECVD (See, p. 1375, col. 1). Therefore, contrary to what the Examiner has alleged, silanol groups are not inherently contained in the substrate taught by Veerasamy.

Second, according to Theil et al. silanol groups are formed only under specific conditions: using PECVD and a particular mixture of process gases (See, p. 1375, col. 2). Veerasamy does not teach either condition. Thus, the DCL layer as taught by Veerasamy cannot inherently contain silanol groups.

Thus, for at least the above reasons, Veerasamy does not teach each and every element of independent claim 1, because the DLC layer does not inherently contain silanol (Si-OH) groups. Therefore, Veerasamy cannot anticipate independent claim 1. Claims 4 and 5 both depend from claim 1, thus they are not anticipated by Veerasamy for at least the same reasons.

Reconsideration and allowance of the claims are respectfully requested.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 1-5 are rejected under 35 U.S.C. § 103(a) as unpatentable over Hozumi et. al., *Langmuir*, **1999**, 15(22), 7600-7604 ("Hozumi"). (Office Action dated 03/27/07, page 5) In particular, the Examiner has alleged that treating substrate surfaces using a mixture of FAS compounds is obvious over Hozumi. (Office Action dated 03/27/07, page 5) Applicants respectfully traverse this rejection.

It has been held that where unexpected, or unexpectedly good, results have been obtained from an invention, such results can support nonobviousness. *In re Dillon*, 692-93, 16 U.S.P.Q.2d 1987, 1901 (Fed. Cir. 1990). Such results have been shown for the present invention. In particular, it has been shown that substrate surfaces treated by the claimed method provide unexpected high product yield when a biological reaction, e.g., a polymerase chain reaction ("PCR"), is carried out on the treated substrate surfaces.

Hozumi teaches preparing water-repellent (i.e., hydrophobic) surfaces using individual FAS compounds. The surface properties Huzumi has tested after coating a surface with a single FAS compound are water-repellency, film growth rate, and film thickness (See, p. 7601, col. 1 and 2, Figure 1).

In contrast, the present application teaches treating substrate surfaces using a mixture of FAS compounds to be used in biological reaction systems, e.g., polymerase chain reaction

("PCR"). Evidence of unexpected results have been disclosed in the specification and summarized in the following.

Experimental data suggests that when treating a substrate surface using, for example, a fluorinated monomer (e.g., a single FAS compound as used by Hozumi), to make the surface hydrophobic leads to a lowered product yield if PCR is carried out on the treated surface as compared to an untreated surface (See, specification, p. 2, lines 11-18). The lowered PCR product yield is represented by a low amount of DNA obtained from the PCR reaction. This reduced product yield is evident from Comparative Example 1 in which a silicon substrate surface has been treated with a compound having the formula of $(MeO)_3$-Si-$(CH_2)_2$-$(CF)_7$-CF_3 (See, p. 6 line 29 to p. 7, line 4), and has been used to carry out PCR. In particular, the PCR product yield from Comparative Example 1 is 5.1 ng/μl, which is about 8-times lower than the amount of PCR product obtained when the PCR is carried out in a polypropylene tube, a typical apparatus used for carrying PCR reactions (See, Table 1, also compare Figures 3 and 5).

It has been unexpectedly found by the present application that when a mixture of FAS compounds is used to treat a substrate surface, an unexpected high yield of PCR product is obtained. This unexpected result is illustrated by Example 1 in which a silicon substrate surface has been treated using a mixture of compounds having the formulae of $(MeO)_3$-Si-(CH_2)-CH_3 and $(MeO)_3$-Si-$(CH_2)_2$-$(CF)_7$-CF_3 as taught by the present application. In particular, the PCR product yield of Example 1 is 40.1 ng/μl. This result is unexpected since it is about 8-times higher than the PCR product yield obtained using a substrate surface treated by a single FAS compound (e.g., product yield obtained in Comparative Example 1), and comparable to the amount of PCR product obtained when the PCR is carried out in a polypropylene tube, a typical apparatus used for carrying out PCR reactions (See, Table 1; also, compare Figures 2, 3, and 5).

In sum, the present application discloses and claims treating substrate surfaces using a combination of FAS compounds, and an unexpectedly high PCR product yield is obtained when PCR is carried out on such treated surfaces. This unexpected high PCR product yield is strong evidence of nonobviousness of the claimed method over the cited art. It is believed that

the claims herein should now be allowable to Applicants. Consequently, reconsideration and allowance are respectfully requested.

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance are requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

CANTOR COLBURN LLP

By: _____

David Rodrigues,
Registration No. 50,604
Confirmation No. 1569
CANTOR COLBURN LLP
55 Griffin Road South
Bloomfield, CT 06002
Telephone (860) 286-2929
Facsimile (860) 286-0115
Customer No.: 23413

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